From wagons to air ambulances: Medevac keeps the fight alive

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Safely transporting injured service members from the battlefield has always been a challenge, but tools, technology — and the people behind them — have enhanced the medical evacuation process to save warfighters.

Racing against time

Before the Civil War, the wounded often had to wait for whoever could reach them first, using a wagon or cart to carry them off, explained Bryant Macfarlane, curator of the https://www.armyaviationmuseum.org/ at Fort Rucker, Alabama.

During the American Revolution, “regimental bands often carried wounded troops from the field,” said Alan Hawk, historical collections manager at the National Museum of Health and Medicine, in Silver Spring, Maryland. “After battles, surgeons from opposing sides sometimes cooperated to care for the wounded left behind.”

“It starts as a problem the Army didn’t know how to solve,” said Macfarlane. “Through the Mexican-American War, there was no organized way to get a wounded soldier off the field.”

The Civil War brought new challenges of evacuation: larger armies, deadlier weapons, and heavier casualties overwhelmed surgeons after “early-war chaos” left wounded soldiers on battlefields for days, said Macfarlane.

“The casualties just suddenly shot up” during the Civil War, said Hawk. “The old system left wounded troops waiting too long.”

Building on Army Brig. Gen. Charles Tripler’s designs of anambulance wagon, Army Maj. Jonathan Letterman, medical director of the Army of the Potomac, developed a more complete, organized ambulance corps system with dedicated wagons and stretcher-bearers.

Macfarlane said the new system marked a turning point. “For the first time, evacuation was a deliberate military process rather than an emergency improvisation.”

The Civil War also used hospital trains and ships to move patients over long distances — bypassing rough terrain and roads which often risked further damage to wounds and broken bones, said Hawk.

World War I saw the adoption of motor ambulances, larger hospitals, and more organized medical logistics, according to an article published in the Military Review, the Professional Journal of the U.S. Army.

World War II expanded air evacuation, with fixed-wing aircraft transporting patients to hospitals across oceans and combat theaters. During the war, Army Maj. Gen. David Grant, the grandfather of aeromedical evacuation, turned air evacuation from concept to reality. He advocated for an aeromedical evacuation system with flight nursing and aviation medicine.

Then came what Macfarlane calls one “of the single most transformative platforms of evacuation” — the helicopter. Bypassing roads entirely, evacuation times went from hours or days to minutes. Army Lt. Carter Harman performed the first combat helicopter rescue while extracting a downed pilot and three wounded British soldiers from behind Japanese lines in 1944 near the end of WWII.

Helicopters were game-changing because they "marked the first time an aircraft could reach the wounded where they actually fell, not just at the nearest airfield," said Macfarlane. They could lift troops from difficult terrain and transport them to a field medical unit in minutes, without the need for an airstrip.

Along with nearby mobile medical units, helicopters were used during the Korean and Vietnam Wars, performing lifesaving operations not possible in prior conflicts.

During the Vietnam War, helicopter evacuations from a conflict zone earned the call sign "dustoff" because pickups in dry fields blew dust, dirt, and debris around the troops waiting below.

The UH-1 Huey became the symbol of medevac, and crews earned acclaim for their heroic actions in rescuing and saving the lives of thousands of injured service members. Army Maj. Charles Kelly, commander of the http://history.army.mil/portals/143/Images/Publications/catalog/90-28-1.pdf Detachment in Vietnam, famously answered, "When I have your wounded," when warned away from a dangerous landing zone.

In the 2000s during conflicts in Iraq and Afghanistan, blast wounds from roadside bombs were more common and severe than in past conflicts, and warfighters worked in smaller units to avoid detection and to limit casualties, Hawk noted. Trained medics were embedded with units, providing immediate care within seconds, and "today's medevac helicopters are essentially flying intensive care units," Macfarlane added.

Modern medevac is more than just getting to the injured quickly, he added. "It is treatment in motion."

The idea of the golden hour, the principle that a wounded service members chances of survival rise exponentially if they receive definitive surgical care within 60 minutes of injury, was an important achievement during the conflicts in Iraq and Afghanistan. "Almost every advance in medevac has been an attempt to defend that hour," Macfarlane explained.

The creation of tools such as regional anesthesia, the Special Medical Emergency Evacuation Device, and the use of Critical Care Air Transport Teams have turned military aircraft into flying hospitals, making long-distance evacuations possible.

"We've built ourselves a 6,000-mile-long ICU … it's brilliant, it's exciting, it makes all the difference in the world," commented Army Lt. Col. Chester Buckenmaier III while serving in Iraq. Along with a team of military medical experts, he pioneered the use of regional anesthesia on the battlefield and during transport.

Medevac more than equipment: It's about the people

Medevac history often centers on aircraft, but "people built the mission," stressed Macfarlane, who himself served as a "guardian angel" on medevacs, the armed escorts flying alongside unarmed medevac aircraft. "It isn't just a story about machines; it's a story about the people those machines exist to reach."

Names like Tripler and Letterman may get a lot of attention, but countless others continually evolved the medevac system, and medical techniques that gave the injured warfighter a better chance of survival on the battlefield, including:

- Army Maj. Gen. Spurgeon Neel shaped modern aeromedical evacuation by connecting medevac with trauma care, logistics, and command structure, with the establishment of the U.S. Army Aeromedical Research Laboratory.
- Navy Capt. Frank Butler was a founder of Tactical Combat Casualty Care.
- Army Chief Warrant Officer Michael Novosel flew more than 2,500 medevac missions in Vietnam and recovered thousands of wounded.

Innovations improving the rescue

With each new lifesaving medevac innovation and tool, Macfarlane said, "evacuation became treatment, not just transportation."

The development of numerous techniques, systems, and equipment across conflicts has made medevac safer, faster, and more effective, with innovations including:

- Ambulance systems, like the Rosecrans Ambulance, the Forage Wagon, and Tompkin's Wheeled Stretcher.
- https://www.thenmusa.org/armyinnovations/innovationsmedevac/ allowed crews to retrieve wounded troops when terrain or enemy fire made landing impossible.
- Medical records, Hawk noted, "evolved from basic tally and tags to information that can move with the patient from the medic to the aircraft to the hospital," making each transition smoother for the patient and healthcare worker.
- Miniaturized medical equipment, such as ruggedized ventilators, monitors, and infusion pumps, enables air crews to deliver hospital-level care.
- Blood products, like whole blood and plasma, and pharmaceuticals at the point of injury have raised survival rates for wounded soldiers.
- Hospital ships used since the Civil War began as modified river steamers and oceangoing steam vessels. Ships like USS Red Rover, USS Relief, USS Repose, and USNS Comfort enable the U.S. military to provide immediate hospital care close to the front lines.

Medevac for the future fight

Senior leaders across the Military Health System often warn that the next war may make prolonged field care a necessity.

Future battlefields will include enemy drones, long-range weapons, air defenses, and cyberattacks threatening aircraft, roads, and communications, Hawk said, making medical logistics and timely evacuation difficult.

The future of medevac may look "less like one helicopter racing to one landing zone and more like a network of medics, aircraft, autonomous systems, data links, and forward surgical teams," Macfarlane noted.

Regardless of the conflict or environment, "if you go down," Macfarlane said, "the system is built to come get you. The unchanging core in every mission is there is going to be a soldier on the ground who believes the system is coming for them, and a crew who has decided they will go … the technology is what makes it possible. The decision is what makes it real."

Mission readiness depends on evolving medevac systems not only to get the warfighter back into the fight, but also to honor the military ethos, "leave no man behind," said Hawk.

"We make a promise to the soldier, the sailor, the airman, or the guardian," Hawk continued, "if we're going to put you in harm's way … we will do our best to get you out. We will take care of you."

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